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09/166,457	11/23/1998	STEVEN L. KONNTZ	MSC-22419-6	9158

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EXAMINER	
PADGETT, MARIANNE L	
ART UNIT	PAPER NUMBER
1762	6

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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

Office Action Summary	Application No. 09/166,457	Applicant(s) Steven Konntz
	Examiner M.L. Padgett	Group Art Unit 1762

—The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address—

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

☒ Responsive to communication(s) filed on 10/5/98.

☐ This action is **FINAL.**

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 1 1; 453 O.G. 213.

Disposition of Claims

☒ Claim(s) 15-26 is/are pending in the application.

Of the above claim(s) ______ is/are withdrawn from consideration.

☐ Claim(s) ______ is/are allowed.

☒ Claim(s) 15-26 is/are rejected.

☐ Claim(s) ______ is/are objected to.

☐ Claim(s) ______ are subject to restriction or election requirement

Application Papers

☐ The proposed drawing correction, filed on ______ is ☐ approved ☐ disapproved.

☐ The drawing(s) filed on ______ is/are objected to by the Examiner

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119 (a)-(d)

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119 (a)-(d).

☐ All ☐ Some* ☐ None of the:

☐ Certified copies of the priority documents have been received.

☐ Certified copies of the priority documents have been received in Application No. ______.

☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a))

*Certified copies not received: ______.

Attachment(s)

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). ______

☒ Notice of Reference(s) Cited, PTO-892

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Interview Summary, PTO-413

☐ Notice of Informal Patent Application, PTO-152

☐ Other ______

Office Action Summary

1. Claims 15-26 are objected to or rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In line 1 of claim 15 "the surface" is objected to as lacking proper antecedent basis, and the three specific items which include two surfaces introduced in lines 3-4, do not agree with the term "both" which means there were only two. How "the surface" (line 1) and "the surfaces" (line 4) relate is poorly defined. In claim 22, which of the 3 different single surfaces is being referred to? The one introduced in the preamble or the exterior or the interstitial?

In line 6 of claim 15, "remote" from where and "discharge" of what? Is the discharge referring to something like electricity as used in the electric discharges that can form radicals in a plasma? Or is it referring to a site where activated gas is input into the reaction space? Or what? Some discussion relating to these topics was found on p. 12 of the specification, but do not adequately indicate the intended meaning or metes and bounds of the phrase "remote discharge". For example, lamps (even "discharge" lamps) are not generally considered to produce discharges that form radicals, because the light produced by the lamps is not called a discharge and the light is what forms the radicals and generally activates the gases on which the light impinges. The discharge in a lamp is generally in an enclosed space totally separate from the source gas of the reactants. So while the term remote discharge, used in the claim makes sense when referring to plasma discharge reactions, it does not with respect to all the listed "...conditions" of page 12, thus the meaning is confusing.

In claim 26, the Markush group is objected to as containing species that are subsets of other species. According to page 30 of applicant's specification, BHT is an example of an

antioxidant, in fact it is the only example given that is not a tradename that is meaningless to the examiner. Also, the species "hinered amine light stabilizer" is only defined by tradenames as example on p. 30, so any amine that might be considered "hindered" (? sterically?) will be considered to read on this species, lacking any more specific definition.

Acronymes should only be used in claims, after they have been defined on their first usage in the claim, therefore "BHT" should be written out in full.

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (e) the invention was described in-
>
> (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or
>
> (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 15-21 and 23-25 are rejected under 35 U.S.C. 102(e) or (a) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Callebert et al (USPN 5,376,413 or WO 92/03591).

Note that the U.S. Patent provides the translation for the PCT, and while the PCT has the earlier date, the US Patent still has a good filing date, because the CIP related parent PN 5,369,012 does not have all elements of the claims, such as the generic remote [gas activation] or use of NH_3 or $N_2 + H_2$ to produce amino groups.

Callebert et al teach surface treating a textile fiber, such as yarns and/or polypropylene, a polyolefin (col. 3, lines 10-25 and col. 6, lines 25-31), using cold flowing plasmas, which are remote plasmas or post-discharge plasmas taught to cause "surface radical reactions of free atoms or of excited molecules creating an effect promoting functionalization of the surface of the substrate" (abstract; col. 4, lines 39- col. 5, line 68, esp. col. 5, lines 61-68; Figure 3 and col. 6, lines 15-25). The working pressure for the plasma is taught to be < 50 mb which is approximately less than 4 torr. It is taught that the activation step may be preformed with N_2 gas or with "doped" N_2, where possible "doping agents" or "coagent" gases include O_2, Ar, ...NH_3, etc. (col. 2, lines 66-68; col. 5, lines 31-46 and the example on col. 8).

Callebert et al do not discuss the porous nature of their substrates, however a yarn is a continuous strand composed of fiber<u>s</u> or filament<u>s</u> which is inherently porous, hence treating the yarn surface would include treating the surface of the "pores" or "interstitial" areas between the fibers, that are contiguous or connected with the outer surface. Alternately, it would have been obvious to one of ordinary skill in the art, that inorder to increase the adhesiveness of yarn surfaces and provide the desired antisoiling and antiwettability properties (col. 1, lines 5-9), one

must effectively treat the pores and crevices, or sites for soiling and absorption will remain untreated, hence the plasma process would have been optimized to enable plasma treatment, and subsequent processing of all exterior and "interstitial" surfaces. Notice is taken that the pulsed nature of delocalized discharge regin (14) would have been expected to aid in the penetration of crevices/pores on the yarn. Note as the activation step is not etching significantly or depositing more than functional groups, no change in pure volume outside of 10% more or less would have been expected to occur. What happens to the pores afterwards when coating occurs, is irrelevant to the claim as presently written.

Callebert et al follow their plasma activation with a polymerization reaction which coates the yarn or fibers, via reaction with the activated surface (abstract, col. 2, lines 41-53^{+}; col. 6, lines 3-14^{+}, etc), thus reading in a generic chemical reagent that eliminates surface radical, etc.

Callebert et al does not discuss the chemical form of the functionalities formed by their remote plasma, however given like gases, used in like discharges to treated like surfaces, inherently the same functional groups would have been expected to have been inherently formed.

4. Demuth et al is cited for having teachings analogous to those in Callebert et al (abstract, figures, summary), but their polypropylene substrates are not fiberous and they do not teach additional gases besides N_2 in their remote plasma, however they do indicate that these nitrogen containing plasmas produce amino-groups on the plasma treated substrate (Fig. 2; col. 2, lines 15-44; col. 3, lines 12-30 & 49-60; and col. 4, lines 19-34), thus substantiating the above assertion of the presence of claimed functional groups.

5. Claims 15-17, 19-21 and 23-25 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Manabe et al.

Manabe et al teach a remote plasma process that uses oxygen gas to activate polyolefin surfaces by production of C=O groups thereon (abstract; Figures; col.1, lines 6-16, 26-30 and 40-52; and col. 2, lines 37-45 and 65-68. Plasma parameters include pressures of 0.1 to 1.0 torr (col. 2, lines 46-49), and the various forms of polyolefin that may be treated include PP with paper fiber or wood flour (col. 2, lines 1-7) where PP stands for polypropylene, and these composite materials would have been necessarily porous due to the nature of the fillers used therein. Also, note that the solvent treatment that precedes the plasma treatment causes swelling or coarsening of the surface (col. 2, lines 58-65), further implies porosity for the polyolefin being treated.

While Manabe et al do not discuss surface treatment of interstitial surfaces, since interstitial surface are not mentioned, the taught substrates with porous natures (as discussed above) would inherently have had pore surfaces contiguous with their outer surfaces treated by the flow of activated gas from the plasma region 6, through the treating chamber 7 and out via vacuum pump 9. Alternately, it would have been obvious to one of ordinary skill in the art, that porous polypropylene substrates, included by Manabe et al's substrates would have required the surface of pores to be treated inorder to produce the taught improved adhesion of subsequent coatings, hence would have adjusted pressure and flow conditions to ensure pore treatment thereby. Again activation by functionalization would not add or subtract significant volume to the pores, being at most several atoms difference in thickness.

6. Claims 15- 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gsell in view of Manabe et al or Goldberg et al, optionally in view of Siemon et al.

Gsell teaches gas plasma treating a porous medium to improve its separation abilities for fluids. The porous medium may be made of polyolefins, and may be shaped before they are

plasma treated, where the plasma treatment includes treatment of the porous surfaces (abstract; summary; col. 3, lines 40 – col. 4, line 45 and col. 6, lines 47-61. Gsell's treatment may optionally include deposition, and useful gases are taught to include ...Ar, N_2, O_2, air, NH_3 ... H_2 ..., etc, alone or in combinations, with oxygen being the preferred gas, and plasma pressures including ranges of 0.001-100 torr, but preferably 0.01-1 torr (col. 4, lines 59- col. 5, line 20; Ex. 1 &3; and claims 11, 14-16 & 19-22). Note since multiple taught gases may be used, with O_2 preferred, and NH_3 a possibility, use of both these gases on a porous substrate is suggested, so that sites functionalized by the oxygen in the plasma, may be further modified by excited NH_3 species, thus reading on the claimed a chemical agent treating functionalized surface to eliminate free radical of organic peroxides. Also, H_2 another possible plasma gas is a reducing agent, and would have been expected to increase –OH functionalities by reacting the C=O groups found by O_2.

Gsell differs from applicant's claims by not employing a remote plasma, however Manabe et al who may also O-plasma treat polyolefin surfaces, that include those having porous natures shows remote plasmas to be effective for functionalization for like gases and pressures, hence it would have been obvious to one of ordinary skill in the art to employ an apparatus as taught in Manabe et al due to the taught equivalent ability to cause functionalization, especially as advantageously for temperature sensitive polymers, over heating by the plasma can be avoided due to its remote location, with Manabe et al's Fig. 1 illustrating temperature control for the process. Optionally Siemon et al, who also plasma treats polyolefin porous substrates with plasmas that can be from H_2, O_2, N_2, etc, (abstract; col. 2, lines 3-13 and col. 3, lines 4-17), teach that any activation variety (RF, microware, A.C., D.C.) is effective, but that non-equilibrium

plasmas that are near ambient temperature should be used, not equilibrium plasmas, because their higher temperatures may damage the substrate (col. 3, lines 18-31). As the same kinds of substrate materials are used in all these references, their teaching on the applicability of the different types of plasma generating sources and types of plasmas would have been significant to and advantageous to Gsell's process.

Goldberg et al is considered equivalent to Manabe et al, for showing the use of remote plasma as illustrated in Fig. 12, for treating substrates includes of polyolefins (col. 9, lines 53-62^{+}; col. 10, lines 52-66 and col. 11, lines 2-55), that may include O_2-plasmas treatments (col. 11, lines 55-65 and example 3 on col. 14), with the above reasoning for the combination analogous.

7. Other art of interest includes Kusano et al and Lidel, with more remote plasma teachings. Jacobs et al, Okita, Sharma, Pan et al, Yahiaoui et al and Parker et al provide further teachings on plasma treatments of porous and fiber fiberous substrates.

8. Any inquiry concerning this communication should be directed to M L. Padgett at telephone number 703-308-2336 on M-F from about 8 am to 4:30 pm; and Fax # (703) 872-9310 (regular); 872-9311 (after final); and 305-6078 (unofficial)

M. L. Padgett/mn 12/24/02
December 30, 2002

Marianne L Padgett

MARIANNE PADGETT
PRIMARY EXAMINER